
Non-Toxic, Highly-Effective Bioinspired Cryoprotectants for On-Demand Stem Cell Therapies

Grant Award Details

Non-Toxic, Highly-Effective Bioinspired Cryoprotectants for On-Demand Stem Cell Therapies

Grant Type: Quest - Discovery Stage Research Projects

Grant Number: DISC2-10129

Project Objective: To develop novel cryoprotectant solutions for preserving viability and function of human pluripotent stem cells (hPSCs) and hPSC-derived cardiomyocytes

Investigator:

Name:	Xiaoxi Wei
Institution:	X-Therma Inc.
Type:	PI

Human Stem Cell Use: Embryonic Stem Cell, iPS Cell

Award Value: \$887,883

Status: Active

Grant Application Details

Application Title: Non-Toxic, Highly-Effective Bioinspired Cryoprotectants for On-Demand Stem Cell Therapies

Public Abstract:**Research Objective**

An advanced technology is sought to replace the toxic, ineffective and highly processed components in legacy cryopreservation media. This technology is a fundamentally novel non-toxic freezing media.

Impact

The transport and storage of stem cell therapies is crippled by freezing media with poor cell preservation. Significantly improved freezing media would directly increase therapy success rate.

Major Proposed Activities

- Human pluripotent stem cells will be cryopreserved using groundwork proof-of-concept cryopreservation formulas and cells will be evaluated for cytotoxicity and survival by post-thaw analysis.
- Bioinspired polymers with ice-inhibiting properties will be synthesized and optimized for inclusion into a new freezing media.
- Freezing media formula and methods-of-use will be further developed (from Activity 1) to freeze and thaw a model stem cell system yielding ultra-high cell survival and viability.
- Human induced pluripotent stem cells will be cryopreserved using advanced freezing media. Survival and phenotype of differentiated cells will be compared to non-frozen and DMSO-preserved cells.
- A functional analysis of cryopreserved differentiated cells will be completed using secondary screened freezing media and methods-of-use with comparison to non-frozen and DMSO-preserved cells.
- Scale-up for a translational application. The formula will be selected from Activity 3/4/5 and the freeze media will be scaled in preparation for work with an industrial cell manufacturer.

Statement of Benefit to California:

California is home to the world's most cutting-edge stem cell research to advance biomedical therapies and improve the quality of life for those suffering from a wide variety of diseases. Yet, the infrastructure to safely deliver on-demand cell therapeutics is lagging behind. This proposal supports a critical value to Californians: calm and comfort from knowing their therapy can be stored, transported and delivered safely to their bedside in a time of need, with maximum therapeutic efficacy.

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